Volunteer Lake Assessment Program Individual Lake Reports

CONTOOCOOK LAKE, JAFFREY, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,888	**Max. Depth (m):**	7.1	**Flushing Rate (yr^{-1}):**	6.8
Surface Area (Ac.):	380	**Mean Depth (m):**	2.2	**P Retention Coef:**	0.5
Shore Length (m):	11,700	**Volume (m^3):**	1,944,000	**Elevation (ft):**	1009

TROPHIC CLASSIFICATION

Year	Trophic class
1988	MESOTROPHIC
2006	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

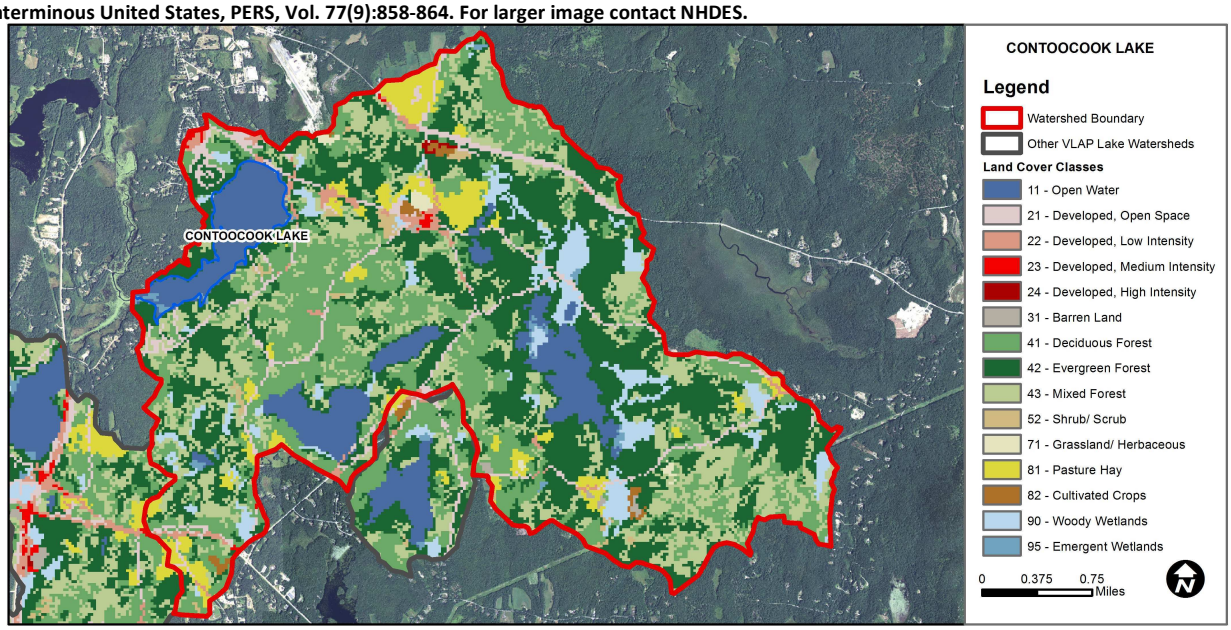
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CONTOOCOOK LAKE - TOWN BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	9.12	Barren Land	0.18	Grassland/Herbaceous	0.34
Developed-Open Space	4.21	Deciduous Forest	21.28	Pasture Hay	4.42
Developed-Low Intensity	1.33	Evergreen Forest	32.86	Cultivated Crops	0.41
Developed-Medium Intensity	0.16	Mixed Forest	19.15	Woody Wetlands	5.37
Developed-High Intensity	0.08	Shrub-Scrub	0.65	Emergent Wetlands	0.48

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2015 Data Summary

Recommended Actions: Water quality was very good in 2015 and phosphorus and chlorophyll levels were below average for the lake. The dry weather conditions in 2015 and lack of stormwater runoff may have contributed to the improved water quality. This highlights the importance of managing stormwater runoff and reducing erosion from dirt/gravel roads, steep slopes, impervious surfaces, and sandy beaches. DES' "N.H. Homeowner's Guide to Stormwater Management" is a great resources for homeowner. It is also important to maintain vegetated buffers along the shoreline to prevent erosion from stormwater and/or wave action. UNH Cooperative Extension's "Landscaping at the Water's Edge" is another great resource. Encourage local road agents to obtain a Voluntary NH Salt Applicator License through UNH Technology Transfer Center's Green SnowPro Certification program. Keep up the great work!

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels remained stable and low from June through August. Average chlorophyll levels were less than the state median and were the lowest measured since monitoring began! Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began. We hope to see this continue!
- **Conductivity/Chloride:** Deep spot, Dam Outlet, Cochrane Inlet W, Jowder Cove Inlet, and Townline Inlet conductivity and chloride levels were slightly greater than the state medians however not generally above a level of concern. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity with moderate variability between years. Cochrane Inlet E, Squantum Inlet, Taft Inlet, and Woodbound Inlet conductivity levels were elevated and much greater than the state medians. Chloride levels were also elevated but not greater than the state chronic chloride standard.
- **E. coli:** Squantum Inlet, Taft Inlet and Townline Inlet E. coli levels were low on each sampling event and much less than the state standard of 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels were stable and low from June through August. Average epilimnetic phosphorus decreased greatly from 2014 and was less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus levels were within a low to average range from June through August. Cochrane Inlet E and W, Dam Outlet, Jowder Cove Inlet, Townline Inlet, Walsh Inlet, and Woodbound Inlet phosphorus level fluctuated between low and average levels from June through August and were within average ranges for those stations. Squantum Inlet phosphorus levels were elevated in July and August likely due to wetland influences high in organic content. Taft Inlet phosphorus was elevated in June and it was noted that the beaver dam was back and very low flow conditions were present.
- **Transparency:** Transparency remained fairly stable from June through August and was in a good range for the lake. Average transparency improved (increased) from 2014 and was approximately equal to the state median. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Deep spot, Cochrane Inlet W, Dam Outlet, Jowder Cove Inlet, Squantum Inlet, and Walsh Inlet turbidities were within low to average ranges for those stations. Cochrane Inlet E turbidity was slightly elevated in June potentially due to iron bacteria precipitate. Taft Inlet turbidity was slightly elevated and increased from July to August potentially due to low flows and beaver activity. Townline Inlet turbidity was slightly elevated in July and a small amount of organic matter was noted in the sample. Woodbound Inlet turbidity was elevated in June and low flow conditions and sediment were noted.
- **pH:** Epilimnetic pH was invalidated on each sampling event due to a laboratory equipment error and we apologize for the inconvenience. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began. Hypolimnetic and tributary pH levels were generally less than the desirable range 6.5-8.0 units and

Station Name	Table 1. 2015 Average Water Quality Data for CONTOOCOOK LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	4.2	2.48	16	91.1		9	3.25	3.46	1.20	
Hypolimnion				89.0		11			1.45	6.35
Cochrane Inlet E			41	192.2		9			1.54	6.00
Cochrane Inlet W			28	134.3		15			0.57	4.70
Dam Outlet			25	80.9		11			0.75	5.77
Jowder Cove Inlet			26	116.0		14			0.81	6.17
Squantum Inlet			56	231.1	13	52			1.34	6.23
Taft Inlet			67	258.4	30	42			2.36	6.06
Townline Inlet			17	85.0	60	11			1.34	6.37
Walsh Inlet			3	32.6		17			1.22	6.46
Woodbound Inlet			46	238.0		17			6.73	6.54

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Worsening	Data significantly decreasing.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.